

## AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

1. (Currently Amended) A transmitting method in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:

(a) generating a pilot signal and transmitting data signals for several channels with different information, said data signals including a pair of data signals and additional data signals; (b) supplying a pair of the data signals to a complex multiplier and spreading the pair of the data signals with complex orthogonal codes to obtain complex valued first spread signals, and spreading the additional ~~said~~ data signals with complex orthogonal codes to obtain second spread signals; (c) adding the first complex valued spread and the second signals; (d) scrambling the added complex valued signals using complex valued PN (Pseudo-Noise) sequences; (e) modulating the scrambled signals with a carrier; and (f) transmitting a composite signal created by adding the modulated signals,

wherein the complex spreading step and the complex scrambling step are arranged to improve the PAR (Peak-to-Average power Ratio) characteristic of the transmitter, and

wherein the second complex-domain scrambling codes ( $C_{\text{scramble}, I}[n] + j C_{\text{scramble}, Q}[n]$ ) in the scrambling step are given by the following equations in terms of the primary scrambling codes ( $C_1[n], C_2[n]$ ):

(a) when the spreading data vary,

$$C_{\text{scramble}, I}[n] + j C_{\text{scramble}, Q}[n] = C_1[n] + C_2[n]; \text{ and}$$

(b) when the spreading data do not vary,

$$C_{\text{scramble}, I}[n] + j C_{\text{scramble}, Q}[n] = -C_2[n] C_{\text{scramble}, Q}[n-1] H_b[n-1] H_b[n] + j C_2[n] C_{\text{scramble}, I}[n-1] H_a[n-1] H_a[n].$$

2. (Canceled)

3. (Canceled)

4. (Previously Presented) A transmitting method as defined in claim 2 in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:

(a) generating a pilot signal and transmitting data signals for several channels with different information, said data signals including a pair of data signals and additional data signals; (b) supplying a pair of the data signals to a complex multiplier and spreading the pair of the data signals with complex orthogonal codes to obtain complex valued first spread signals, and spreading the additional data signals with complex orthogonal codes to obtain second spread signals; (c) adding the first complex valued spread and the second signals; (d) scrambling the added complex valued signals using complex valued PN (Pseudo-Noise) sequences; (e) modulating the scrambled signals with a carrier; and (f) transmitting a composite signal created by adding the modulated signals,

wherein the complex spreading step and the complex scrambling step are arranged to improve the PAR (Peak-to-Average power Ratio) characteristic of the transmitter, and

wherein the orthogonal complex-domain spreading is performed with Hadamard codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

5. (Previously Presented) A transmitting method as defined in claim 2 in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:

(a) generating a pilot signal and transmitting data signals for several channels with different information, said data signals including a pair of data signals and additional data signals; (b) supplying a pair of the data signals to a complex multiplier and spreading the pair of the data signals with complex orthogonal codes to obtain complex valued first spread signals, and

spreading the additional data signals with complex orthogonal codes to obtain second spread signals; ©) adding the first complex valued spread and the second signals; (d) scrambling the added complex valued signals using complex valued PN (Pseudo-Noise) sequences; (e) modulating the scrambled signals with a carrier; and (f) transmitting a composite signal created by adding the modulated signals,

wherein the complex spreading step and the complex scrambling step are arranged to improve the PAR (Peak-to-Average power Ratio) characteristic of the transmitter, and

the orthogonal complex-domain spreading is performed with Walsh codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

6. (Previously Presented) A transmitting method as defined in claim 2 in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising the steps of:

(a) generating a pilot signal and transmitting data signals for several channels with different information, said data signals including a pair of data signals and additional data signals; (b) supplying a pair of the data signals to a complex multiplier and spreading the pair of the data signals with complex orthogonal codes to obtain complex valued first spread signals, and spreading the additional data signals with complex orthogonal codes to obtain second spread signals; ©) adding the first complex valued spread and the second signals; (d) scrambling the added complex valued signals using complex valued PN (Pseudo-Noise) sequences; (e) modulating the scrambled signals with a carrier; and (f) transmitting a composite signal created by adding the modulated signals,

wherein the complex spreading step and the complex scrambling step are arranged to improve the PAR (Peak-to-Average power Ratio) characteristic of the transmitter, and

the orthogonal complex-domain spreading is performed with Gold codes and the scrambling codes for the complex-domain scrambling are produced using orthogonal Hadamard codes.

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Previously Presented) A transmitting apparatus in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising:

(a) means for generating a pilot signal and transmitting data signals for several channels with different information; (b) means for controlling the signal-gains of the channels (c) means for spreading the gain-controlled signal for each channel; (d) a first complex-domain multiplying means for performing a first orthogonal complex-domain spreading with the input of the transmitting data of the supplementary channels and of the OVSF (Orthogonal Variable Spreading Factor) codes; (e) means for adding the output of the first complex-domain multiplying means and the spread signal; (f) a spreading modulator, comprising a complex-domain multiplier and a scrambling code generator, for modulating the added signal; (g) means for amplifying low-pass filtered signal power; (h) means for modulating the amplified signal to the desired frequency band; and (i) means for adding the modulated signal.

11. (Previously Presented) A receiving apparatus in CDMA (Code Division Multiple Access) systems with a transmitting apparatus and receiving apparatus, comprising:

(a) means for demodulating the transmitted signal from an antenna using the same carrier used in the transmitter; (b) a spreading de-modulator, comprising a scrambling code generator and complex-domain multiplying means, for de-scrambling the modulated signal; (c) means for de-spreading the de-scrambled signal to get the desired channel by integrating for the symbol period proportional to the data rate of the corresponding channel; and (d) second complex-domain multiplying means for correcting the phase of the de-spread signal.

**Serial Number 09/890,249**

12. (Previously Presented) A receiving apparatus as defined in claim 11, wherein the carrier used in the demodulating means of step (a) in claim 11 include the same waves used in the transmitter.